Convex polytopes in algebraic combinatorics, WS 17/18
Exercise Sheet 6

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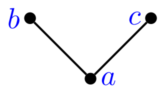
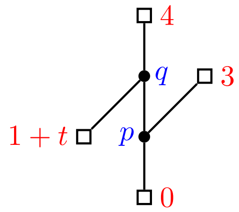
to be handed in on 11, January, 2018 in the lecture.

Exercise 1. Let P be the following poset.



Compute the face lattice of the order polytope $\mathcal{O}(P)$ and the chain polytope $\mathcal{C}(P)$.

Exercise 2.
Let P be the following poset where p, q are non-marked elements.



Study the face lattices of the marked order polytopes and the marked chain polytopes when t varies.

Exercise 3.
For $\lambda = (3, 2, 1)$, determine the face lattice of the Gelfand-Tsetlin polytope $\mathrm{GT}_3(\lambda)$ and the Feigin-Fourier-Littelmann-Vinberg polytope $\mathrm{FFLV}_3(\lambda)$. Are they combinatorially equivalent? Are they unimodularly equivalent? Prove your statements.

Open question for Xmas. For a finite poset P, give a combinatorial description (similar to the Geissinger theorem) of the face lattice of the chain polytope $\mathcal{C}(P)$.

Fröhliche Weihnachten und alles Gute für das neue Jahr!!